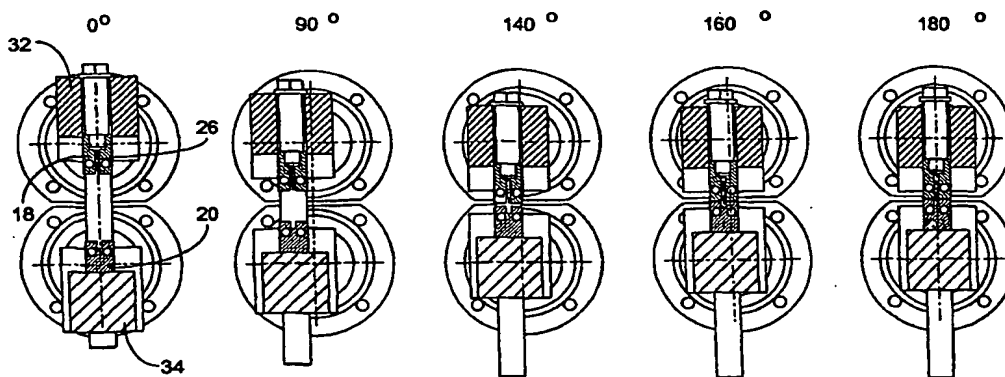




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65B 51/30, 61/08 // B26D 1/62, 5/20		A1	(11) International Publication Number: WO 98/19915
			(43) International Publication Date: 14 May 1998 (14.05.98)
(21) International Application Number: PCT/DK97/00498 (22) International Filing Date: 3 November 1997 (03.11.97) (30) Priority Data: 1219/96 1 November 1996 (01.11.96) DK (71) Applicant (for all designated States except US): TETRA PAK HOYER A/S [DK/DK]; Søren Nymarks Vej 13, DK-8270 Højbjerg (DK). (72) Inventor; and (75) Inventor/Applicant (for US only): HANSEN, Per, Henrik [DK/DK]; Mallingsgardsvej 69, DK-8340 Malling (DK). (74) Agent: K. SKØTT-JENSEN, PATENTINGENIØRER A/S; Lemmingvej 225, DK-8361 Hasselager (DK).			(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. With amended claims. In English translation (filed in Danish).

(54) Title: CROSS JOINING AND/OR CROSS CUTTING DEVICE IN A PACKAGING MACHINE OF THE FLOW PACKING TYPE



(57) Abstract

In a cross joining and/or cross cutting station in a flow packing machine, opposed tool parts are moved in complementary round paths such that they can press against opposite sides of a tubular packaging web for cross closing/cutting the web between successively advanced products therein, during continuous movement of the web. Normally the tool parts are moved by simple rotation, but according to the invention they are moved in a paracyclic manner, i.e. with substantially unchanged orientation in the space. This makes it possible to maintain the tool carrying parts in operative connection with an external power source through flexible wires or hoses, such that in a packaging machine with more packaging lines it is possible to operate all of the tool sets by common moving means, yet also with the possibility of deactuating the tools individually in case of operational disturbances in one or more of the lines. With such an individual deactuation of the tools it is achievable in a desirable manner that the tools will stop their advancing action on the packaging web in the faulty line.

Cross joining and/or cross cutting device in a packaging machine of the flow-packing type.

The present invention concerns a device for cross joining
5 and/or cross cutting of a moving web of paper or foil, especially in packaging machines for the flow-packing of mutually separated items such as consumer ice products, comprising a clamping tool which is moved in a circular path, possibly containing a knife to carry out a cut from the one side of
10 the path towards an opposite and similarly circularly-rotated counter-tool at the other side of the path. These tool parts are typically arranged in a counter-rotating manner, so that they can be pressed towards each other during mutual advancement in a common movement section at the same rate of movement as that at which the product web is advanced. With flow-
15 packing, this advancement is effected primarily by the influence of a driven pair of welding- or stamping-rollers which are used for the formation of a longitudinal assembly seam in the web of paper or foil, which is folded up to form a tubular holster around the products which are placed at mutual
20 intervals on the web. The same tubular holsters must subsequently be cross-joined or cross-cut in the free areas between the products in the formation of individually packaged items, and it is well-known that the aforementioned rotating tool parts can effect both of these tasks, in that the knife
25 holder can be configured as a welding tool or stamping tool for co-operation with a correspondingly-configured anvil, i.e. so that a cross-cut can be produced midway between a welding-together or stamping-together area provided at the
30 same time, and which in one operation closes the rear end of the holster for the leading product and the front end of the holster for the following product.

The said rotating tool parts must naturally be moved synchronously with the advancement of the packaging web.

35 In packaging plants of the type considered, there will often exist several parallel packaging lines in order to achieve a high capacity, and it is hereby advantageous that the said tool parts for all of the webs can commonly be

vancing action which normally takes place in connection with cross joining/cut-ting, and that it is not the cross-cutting function seen solely in itself which is desired to be deactuated, in that this almost per definition will not constitute
5 any hindrance for an easy removal of the web material from the relevant packaging line.

The invention will now be described in more detail with reference to the drawing, in which

Fig. 1 is a schematic view of a known flow-packing line,
10 Fig. 2a)-c) illustrate an associated, known cross-joining and cutting mechanism seen in different positions,

Fig. 3a)-e) are corresponding illustrations of a mechanism according to the invention,

Fig. 4 is a plan view of a multi-line packaging plant according to the invention,
15

Fig. 5 is the same seen from the front, and

Fig. 6 is a detail front view of a tool part therein.

In fig. 1 is shown a flow-packing line with a conveyor
20 belt 2 on the upper side 4 of which there is laid a web 6 of paper or foil which, during its movement forwards, receives individual items 8 which are supplied from a delivery station at suitable intervals, so that the items are deposited on the upper side 4 of the conveyor belt with a given mutual dis-
25 tance between them. By means of fixed, not-shown folding-up tools, there is effected a folding-up and folding-in of the freely projecting side parts 10 of the web 6 in the formation of a tubular holster around the items 8, and the upper edges 12 of the oppositely-facing web sides are pressed or welded
30 together by means of oppositely-facing, driven stamping or welding rollers 14 for the longitudinal closing of the tubular holster.

The packaging web is then advanced further to a cross-joining station 16 in which a pair of tool jaws 18 and 20 are
35 moved in towards each other in the vertical direction for local clamping together of the holster midway between two items 8, and simultaneously during common horizontal movement in the direction in which the web is advanced. As indicated by

cams which, by surrounding, rotating eccentric bushes are made to execute a paracyclic movement as illustrated in a sequence of 180° in fig. 3. In principle, the effect herewith will be just as in fig. 2, i.e. where the tools from an open position, in which they allow the passage of the next item for cutting off (fig. 3a), are brought together for closing (fig. 3c), stamping together of the tubular web (fig. 3d-e) and cross-cutting of this (fig. 3e). During the sequence from 140° (fig. 3c) and all the way forward to 220° (i.e. after fig. 3e), a simultaneous transport of the material web will be effected to the right, again corresponding to fig. 2.

However, compared with fig. 2 there is the very great difference that the tools and their holders do not execute a rotation, but solely the aforementioned paracyclic movement, whereby it is practically possible to install externally-controllable retraction means such as changeover cylinders at any of the individual tools, but in practice at only the one tool. In figs. 4 and 5, such means are shown arranged above the upper beam 32 in the form of control cylinders 36, by means of which the knife tools 18 can be raised to an inactive position in which during continued movement they are unable to establish clamping of the web material. In fig. 5, such a raising of the tool is shown by 36'. It will be understood that it will not pose any problems in principle to arrange individual pressure-medium hoses for the cylinders 36, since these hoses will be exposed only to rocking movements of a limited extent.

Fig. 6 shows in more detail an example embodiment where a stamping tool 18 is housed in a holder 38 which is pressed to a bottom position by a piston rod 40 from a cylinder 42, and in which the tool can carry out its operative movements under elastic upwards displacement in the holder 38. Activation of the cylinder 42 will raise the holder 38 and herewith the tool to the inoperative position.

It should be noted that in principle the relevant group of changeover tools will be able to cooperate with counter-tools housed in accordance with fig. 2.

AMENDED CLAIMS

[received by the International Bureau on 1 April 1998 (01.04.98);
original claims 1 and 2 amended; (1 page)]

1. Cross joining and/or cross cutting device in a packaging machine of the flow-packing type, especially in such machines in which there are conveyed two or more parallel packaging webs in the form of paper or foil holsters containing axially separated packaging items such as consumer ice products, said device comprising cooperating tools moved in complementary circular paths for the cross joining and/or cross cutting of the packaging web in the spaces between the packaged items, in that said tools are periodically brought together from a mutually separated position in which they allow the advancement of the next partly-packed item, to an operative position in which they clamp around the packaging web during simultaneous co-movement in the direction in which said web is advanced, after which they are opened again and retracted to their start position for the handling of the next item, said tools or at least one of the tools preferably being mounted on a guiding part which is controlled to execute a paracyclic movement, by which the tool is moved in said circular path with substantially unchanged orientation in the space, and several sets of tools or at least several individual tools in these sets being disposed on a common movement element, characterized in that the tools or the relevant individual tools are housed in respective holders which are individually coupled to externally-controllable changeover elements, hereby making it possible for an associated tool to be temporarily retracted to a position in which the tool, during its continued movement by the movement element, is deactuated with regard to the clamping-together of the packaging web.

2. Joining or cutting device according to claim 1, in which the common movement element executes a paracyclic movement, and in which the changeover elements of the tool holders thereon are selectively operatively connected to external power supply means through flexible wires or hoses.

2/3

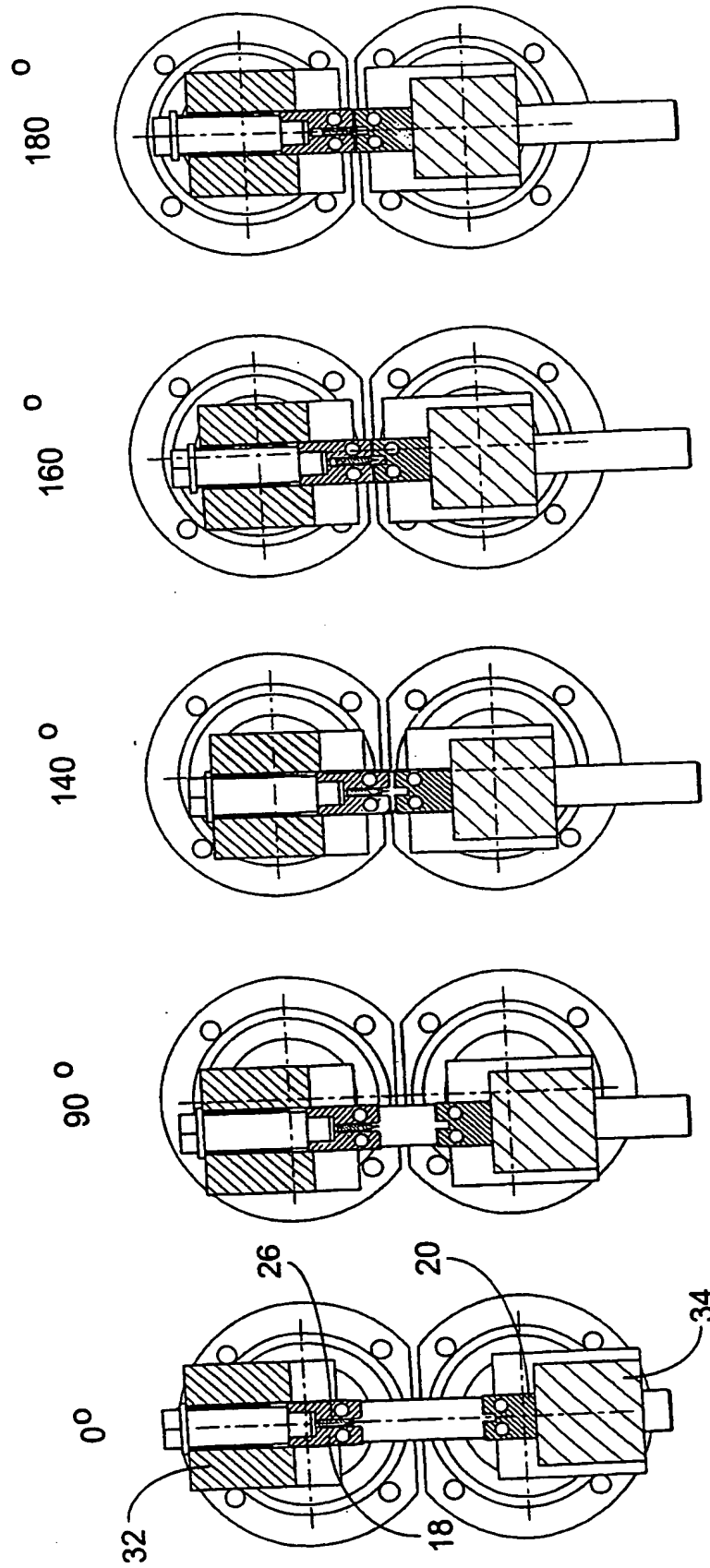


Fig.3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 97/00498

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65B 51/30, B65B 61/08 // B26D 1/62, B26D 5/20
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0290105 A2 (P.F.M. S.P.A.), 9 November 1988 (09.11.88), figure 2, abstract --	1,2
X	DE 2126953 A1 (SCHWEIZERISCHE INDUSTRIE-GESELLSCHAFT), 16 December 1971 (16.12.71), figure 5, abstract --	1,2
A	EP 0725007 A1 (AZIONARIA COSTRUZIONI MACCHINE AUTOMATICHE-A.C.M.A.-S.P.A.), 7 August 1996 (07.08.96) --	1,2
A	GB 2247000 A (CAVANNA SPA), 19 February 1992 (19.02.92) --	1,2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

16 February 1998

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Date of mailing of the international search report

19-02-1998

Authorized officer

Kristina Pederson
Telephone No. +46 8 782 25 00